Fermilab Today

Thursday, July 20, 2006

Calendar

Thursday, July 20

2:30 p.m. Theoretical Physics Seminar - Curia II

Speaker: Y. Shamir, Tel Aviv University

Title: Renormalization-Group Analysis of the Validity of Staggered-Fermion QCD with the Fourth-Root Recipe

3:30 p.m. DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over

4:00 p.m. Accelerator Physics and Technology Seminar - Curia II

Speaker: R. Palmer, Brookhaven National Laboratory

Title: Muon Collider Parameters and Cooling Schemes

Friday, July 21

3:00 p.m. DIRECTOR'S COFFEE BREAK (NOTE EARLIER START TIME) - 2nd Flr X-Over

3:30 p.m. Joint Experimental Theoretical Physics Seminar (NOTE TIME and LOCATION) - Auditorium

Speakers: B. Heinemann, University of Liverpool; A. Zieminski, Indiana University

Title: Tevatron Highlights at ICHEP'06

Click here for a full calendar with links to additional information.

Weather

Areas of Fog **89º/61º**

Extended Forecast

Weather at Fermilab

Current Security Status

Volunteer cleanup today

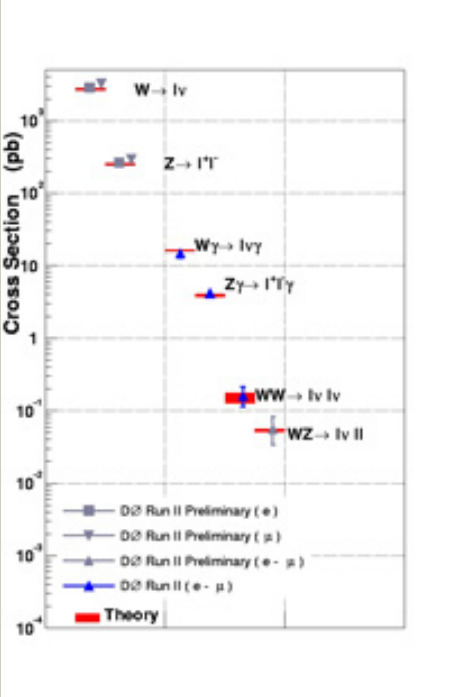
There will be a volunteer cleanup today at 11:45 a.m. (If weather conditions worsen before time of departure, call Bob Lootens at x3303 to make sure the cleanup has not been cancelled.) The target areas include inbound Pine Street starting at Kirk Road, C Road, and Old Batavia Road. A bus will transport volunteers, leaving at 11:45 a.m. sharp at Wilson Hall Ground Floor-East side. After the cleanup, the bus will pick up people earlier than usual (12:30 p.m.) due to the weather. Lunch will be at the Lederman Science Center picnic area. You can find more information here.

Fermilab's NTF offers hope for cancer patients

On the left, a man suffers from a large tumor of squamous cell carcinoma, most likely a result of chewing tobacco. On the right is the same man a few months after a receiving a full course of neutron therapy.

Fermilab Result of the Week

First Evidence for WZ Production



Cross section for vector boson production at the Tevatron. The points indicate the values measured at DZero and their corresponding uncertainties. The red lines indicate the Standard Model predictions, with the line's width giving the uncertainty on the calculation.

The Standard Model of particle physics predicts that the colliding protons and antiprotons at the Tevatron should produce events containing two vector bosons, W's and Z's. This signature is of particular interest to particle physicists, as the coupling of the weak vector bosons to one another is an important consequence of the non-Abelian nature of the Standard Model. The rate for the associated production of W and Z bosons in proton antiproton collisions allows physicists to probe this coupling. In addition, measuring the cross section times branching ratio for such low rate Standard Model processes is an

Secon Level 3

Wilson Hall Cafe

Thursday, July 20

-Santa Fe Black Bean
-Sloppy Joe
-Stuffed Peppers
-Sauteed Liver & Onions
-Baked Ham & Swiss on a Ciabatta Roll
-Assorted Slice Pizza
-Crispy Fried Chicken Ranch Salad

Wilson Hall Cafe Menu

Chez Leon

Thursday, July 20
Dinner

-Layered Mozzarella and Tomato
-Grilled Swordfish w/Chipotle Butter
-Roasted Corn w/Potatoes and Bacon
-Banana Spring Rolls w/Caramel Rum Sauce

Wednesday, July 26
Lunch

-Danish Open Sandwiches
-Cucumber Salad w/Dill
-Apple Walnut Cake w/Crème Chantilly

Chez Leon Menu
Call x4598 to make your reservation.

Search

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Info

Medical physicist Arlene Lennox, director of the Fermilab Neutron Therapy Facility, has many dramatic stories from 30 years of cancer treatment at the facility, including a man whose grapefruit-sized tumor was treated successfully after unsatisfactory results from other therapies. "If he wasn't treated here, he would have had a life-threatening infection," said Lennox, addressing students in the Summer Internships in Science and Technology program on the technology and its benefits.

The Fermilab NTF, now operated by the Northern Illinois University Institute for Neutron Therapy, has treated some 3,100 patients since its inception in 1976. While photon-based therapies can treat fast-growing cancers effectively, Lennox says slower-growing forms are often unresponsive. Neutron therapy combats this problem by using high linear energy transfer (LET) neutrons instead of low-LET photon radiation. With higher energies, the neutrons produced at Fermilab's Linac can destroy radioresistant cancer cells while allowing healthy tissue to heal. "As awful as cancer cells are," Lennox said, "they can't fix themselves like healthy cells can."

Despite neutron therapy's advantages, the facility is only one of six in the world. The NIU Institute is embarking on research efforts to demonstrate the usefulness of neutron therapy and investigate its potential for expanded uses. "I have my little dream of this new facility," Lennox said, showing a floor plan of a building centered about a small linac with four treatment rooms instead of one. "If we were getting the patients who could really benefit, we wouldn't be able

important stepping stone in the search for the Higgs boson at the Tevatron.

The DZero collaboration at Fermilab has announced the first measurement of the WZ production cross section in proton-antiproton collisions. Events in which both the W and Z boson decay to leptons are used to make this measurement. Such events provide the cleanest signature of WZ events, but constitute only 1.4 percent of all WZ decays. Twelve events with three high transverse momentum charged leptons and missing transverse energy (indicating the presence of an undetected neutrino were found with an expected background of 3.6 +/- 0.2 events. The probability for the background to account for these twelve events is 4.1×10^{-4} which constitutes 3.3 sigma evidence for WZ pair production. The cross section times branching ratio for this process is the smallest ever measured at a hadron collider. The WZ production cross section is measured to be 4.0 (+1.9 -1.5) pb which is consistent with the Standard Model prediction of 3.6 +/- 0.3 pb. The data for the DZero result were taken from more than 1 inverse femtobarn of total collision data, and a sample of 1.5 billion recorded events.

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to keep up," Lennox said. "Most people who need neutron therapy don't even know about it."

--Dave Mosher

Photo of the Day

DZero's Lucian Ancu snapped this photo Monday night between SciDet and the Eola/ Batavia road intersection.

In the News

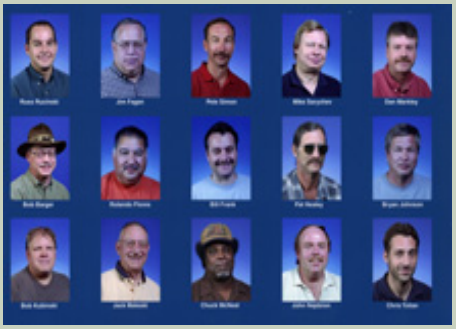
Scientific American, July 17, 2006:

A Hint of Axions: An experiment may have seen an elusive new particle

Named after a laundry detergent and originally proposed to clean up a problem with particle physics, axions are curious critters. Axions produced during the big bang could be lurking all around us, contributing to the dark matter that constitutes 22 percent of the universe. Other axions, freshly formed inside the sun, could be streaming through us. And according to a paper published in March, laboratory-made axions might have been detected for the first time by an experiment in Italy known as PVLAS (polarization of the vacuum with a laser).

Axions are posited to have exceedingly low mass--less than a millionth that of an electron--and are electrically neutral. They interact only very weakly with other particles, making detection difficult. But physicists predict that a tiny fraction of any photons passing through a magnetic

Above: This analysis was contributed to by James Degenhardt (upper-left), Zhou Bing (upper-right), Andrew Alton (lower-left), and Andrew Askew (lower-right). **Below:** The successful completion of the recent shutdown work for DZero relied very heavily on the skill and dedication of the DZero mechanical operations team pictured here.



Result of the Week Archive

Accelerator Update

July 17 - 19

- Booster has BRF17 trouble
- Linac's line voltage sags
- Stash lost
- MI has BPM problems
- LCW temperatures rise

Read the Current Accelerator Update

Read the Early Bird Report

View the Tevatron Luminosity Charts

Announcements

International Folk Dancing

International Folk Dancing will meet Thursday, July 20, in Ramsey Auditorium in Wilson Hall. Dancing begins at 7:30 p. m. with teaching earlier in the evening and request dancing later on. Newcomers are welcome and you do not need to come with a partner. Info at 630-584-0825 or 630-840-8194 or folkdance@fnal.gov.

East entrance to close July 29

On Saturday, July 29, the Batavia Road east entrance to will close for road seal coating and striping. The entrance will be reopened Sunday morning, July 30, at 6:00 a.m. The bicycle path will remain

field will change into axions. (That is how the sun is predicted to produce them.) Indeed, the Italian experiment, based at the National Laboratories of Legnaro and led by Emilio Zavattini and Giovanni Cantatore of the INFN Trieste, saw evidence for axions in the behavior of a laser beam. The beam's polarization was rotated by 10 millionths of a degree after transiting 44,000 times back and forth through an extremely strong magnetic field. Such rotation is just the fingerprint expected if some photons converted to invisible axions, or more precisely, what physicists call axionlike particles.
Read More

open during this period.

Upcoming Activities